CONTRIBUTIONS TO THE MINERALOGY OF NORWAY

No. 33. Idaite, Cu_5FeS_6, from Konnerud near Drammen

By

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Abstract. Idaite was found in microscopic lamellae within bornite from the old mine dumps at Konnerud near Drammen in the Oslo Region.

During an excursion in July 1964 with the Institute of Mineralogy and Petrography, Mining Academy Clausthal-Zellerfeld/Germany, the old mine dumps from Konnerud were visited under the guidance of Prof. Dr. Chr. Oftedahl.

Many samples were taken from the extensive dumps and studied microscopically. Among the minerals identified was the somewhat rare copper-iron sulphide, idaite, a brief description of which follows below.

Idaite is already known from several localities in Norway, though detailed descriptions of the occurrences are lacking. Frenzel (1959) lists (No. 11) idaite as occurring in a polished section from the Langevand district, Suldal, southwest Norway, which he found in the Heidelberg collection of Prof. P. Ramdohr. Dons (1963, pp. 56–57) reports the occurrence of idaite in copper mineralization at the Åbö (Aabö) prospect in central Telemark, while the mineral has also been identified in copper ores from the Raipas district of northern Norway (F. M. Vokes, personal communication).

Microscopic features

Under crossed nicols, idaite is very easily recognized in bornite by its enormous anisotropism (compare Figs. 1 and 2). Otherwise, idaite is very easily overlooked as its comparatively late recognition demon-

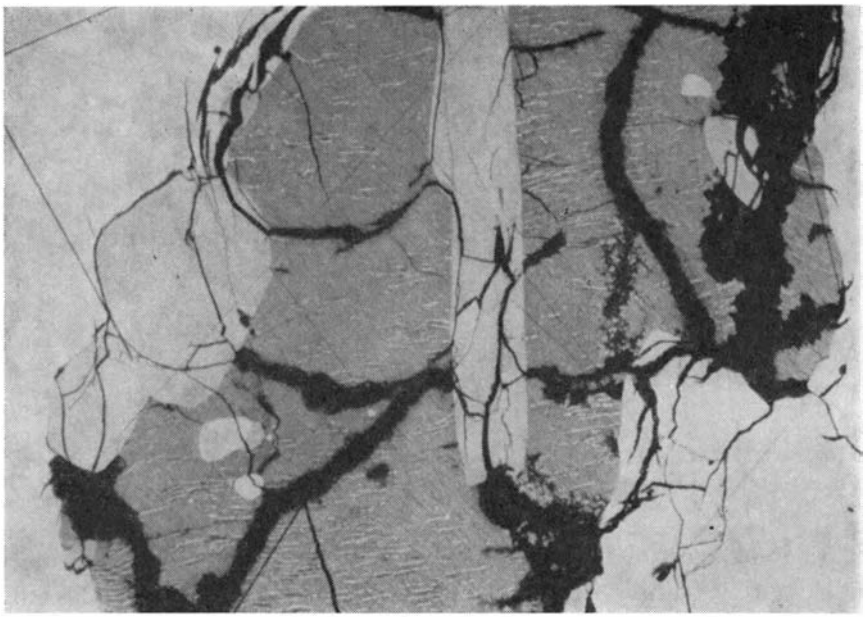

Fig. 1. Magnification × 60, oil immersion. Bornite (gray) has spindle-like exsolution lamellae of chalcopyrite and very fine lamellae of idaite; chalcopyrite is white. Two grains (light gray), the one in bornite and the other one bordering bornite and chalcopyrite are enargite. The characteristic cracks are seen very clearly. The thicker cracks are partly filled with limonite and covellite of the '*blaubleibender*' type.

strates. In the material from Konnerud, idaite was observed only in very fine lamellae within bornite. The mineral is associated here together with spindle-like to platy exsolutions of chalcopyrite, which seem to be older than idaite. Very often within the bornite and the bordering minerals, characteristic cracks are to be observed. These cracks can be so numerous that FRENZEL (1959) spoke of '*Sprung Krankheit*' ('fracture disease'), (see Fig. 3). The other microscopic features of idaite are described in detail by FRENZEL (1959).

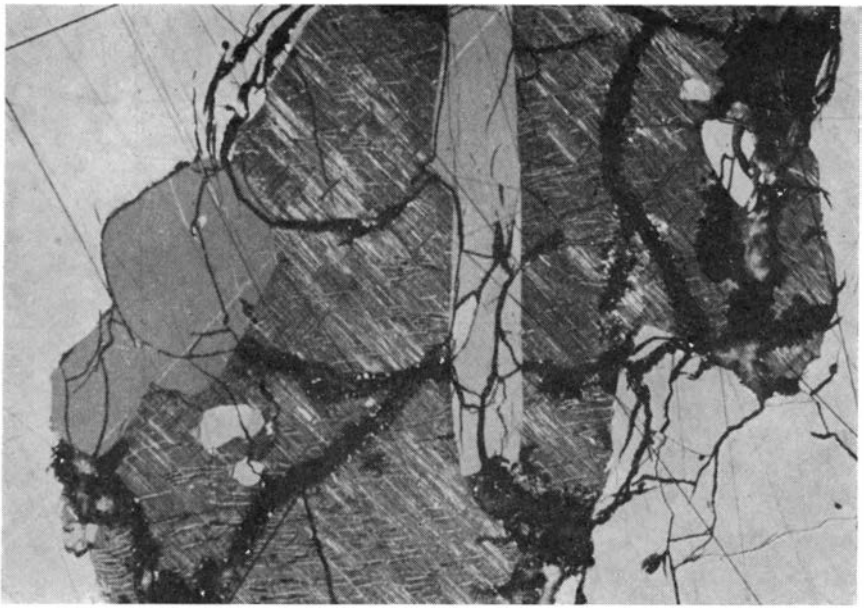

Fig. 2. Magnification × 60, oil immersion, + N. The same photo as number one but taken with crossed nicols. The high anisotropism of idaite is very clearly brought out. Also the anisotropism of enargite is very easily visible. The light specks within the thicker cracks are covellite.

Mineral paragenesis

The mineral paragenesis is rather complex and has to be divided into four genetic groups:

I. primary minerals
II. minerals of exsolution
III. minerals of cementation
IV. minerals of oxidation

To the first group belong the following minerals: hematite, mostly idiomorphic, as flakes within the sulphides and the gangue; sphalerite, full of tiny exsolution blebs of chalcopyrite, partly oriented; pyrite; galena; bornite; bismuthinite; enargite; chalcopyrite; a member of the fahlerz family, and an unidentified Bi-sulphosalt. Of these minerals sphalerite and chalcopyrite are by far the most abundant.

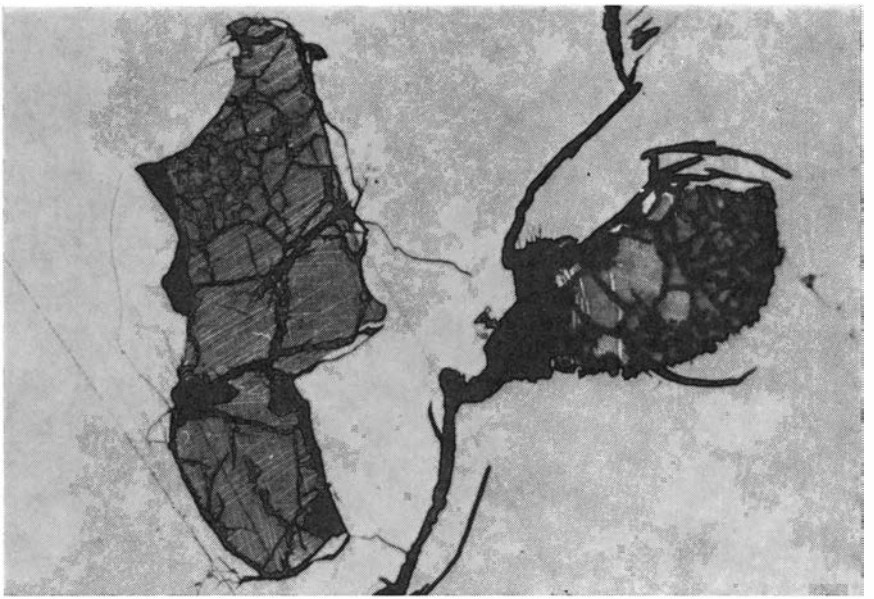

Fig. 3. Magnification × 160, oil immersion. Two bornite grains lie within chalcopyrite. The numerous cracks which were called 'fracture disease' are very well developed.

To the second group belongs only the mineral chalcopyrite. It forms exsolution lamellae and spindles within bornite and exsolution blebs within sphalerite.

To the third group belong the following minerals: idaite, covellite, and chalcocite. The covellite consists of two varieties. The one type remains blue in oil, while the other is of the normal type. Covellite and chalcocite usually fill cracks within the bornite and form crusts upon chalcopyrite and galena.

To the fourth group belong the following minerals: limonite, mostly goethite; cerussite; malachite; azurite. A more detailed search for further minerals of oxidation was not carried out.

As the above description indicates, idaite is a rather low temperature mineral. It obviously forms during the very early stages of the supergene alteration of bornite and as such might be an expression of the first stages of the cementation process. It is therefore grouped together with minerals of cementation and should be expected wherever bornite is subjected to these conditions.

Acknowledgement

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